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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/805,807	03/22/2004	Ashish Singhal	081445-0359	9961

7590 08/23/2005

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EXAMINER	
SAINT SURIN, JACQUES M	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/805,807	SINGHAL ET AL.	
	Examiner	Art Unit	
	Jacques M. Saint-Surin	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,17-22,24-33 and 35* is/are rejected.

7)☐ Claim(s) *14-16,23,34 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment of 06/03/05.

Response to Arguments

2. Applicant's arguments with respect to claims 1-36 have been considered but are moot in view of the new ground(s) of rejection.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-10 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Piety et al. (US Patent 5,922,963).

Regarding claim 1, Piety discloses a method for determining vibration amplitude to detect faults in mechanical equipment (a machine vibration monitoring system, as shown in FIG. 1, is used by machine maintenance personnel to measure and analyze the vibration level of a machine 10 as part of a machine monitoring program, see: col. 4, lines 16-19), comprising:

estimating a data probability distribution based on data for the mechanical equipment (a method for constructing an alarm limit envelope for machines having a

statistically significant amount of historical vibration data available, see: col. 3, lines 28-30);

and utilizing the data probability distribution to calculate the vibration amplitude limits (these envelope functions define vibration amplitude limits above which the machine's vibration levels are considered abnormal, see: col. 4, lines 36-38). See also col. 4, lines 16-35.

Regarding claim 2, Piety discloses all of the data is used to determine a vibration level outer limit beyond which "outliers", or vibration levels lying outside the valid range, are rejected, see: col. 14, lines 11-13.

Regarding claim 3, it is similar in scope with claim 1 and therefore is rejected for the reasons set forth for that claim. Furthermore, Piety discloses the analysis performed by the base computer 14 and the portable vibration analyzer 12 includes processes, carried out by software instructions, which convert the vibration data into vibration frequency spectra, determine if the machine's vibration level has exceeded defined limits, and report to the machine maintenance personnel whether the limits have been exceeded by the measured data, see: col. 4, lines27-33.

Regarding claims 4-5, Piety discloses a method is provided for constructing an alarm limit based on a plurality of machine vibration spectra. This method is applicable to machines for which some historical vibration data is available (or can be extrapolated from other similar machines) but an insufficient amount of historical data is available to be considered statistically significant. The steps of this method include providing a plurality of vibration spectra corresponding to vibration generated

by at least one machine. Each of the vibration spectra provided will include a plurality of peaks where each peak has an amplitude component and a frequency component. A mean vibration spectrum is determined where each amplitude of the mean spectrum represents the statistical mean of all corresponding amplitudes of the plurality of vibration spectra. The mean vibration spectrum is divided into a plurality of frequency windows, and an alarm limit value is calculated for each window. Each alarm limit value represents a maximum vibration level above which the machine's vibration level is considered abnormal for the range of frequencies included in the particular window, see: col. 3, lines 3-22.

Regarding claim 6, Piety discloses an example would be taking all of the data previously measured on the motor of a motor/pump apparatus and using this data to create a single statistical spectrum, see: col. 12, lines 66-67 and col. 13, lines 1-2.

Regarding claims 7-10, Piety discloses a mean vibration spectrum is determined where each amplitude of the mean spectrum represents the statistical mean of all corresponding amplitudes of the plurality of vibration spectra. The mean vibration spectrum is divided into a plurality of frequency windows, and an alarm limit value is calculated for each window. Each alarm limit value represents a maximum vibration level above which the machine's vibration level is considered abnormal for the range of frequencies included in the particular window, see: col. 3, lines 13-18. Piety further discloses Once envelopes have been generated which accurately indicate a limit for acceptable machine performance, these envelopes are stored in the computer memory 42, the measurement device memory 24, or on a storage device 16, 34.

These limit envelopes are then used as standards against which to compare machine performance as the conditions of the machines change over time. As mentioned previously, a particular envelope which has been constructed based on spectra measured on a family of similar machines may be used as a standard for all the machines in the family (col. 5, lines 47-56).

Regarding claim 17, Piety discloses a method and apparatus for effectively developing accurate narrowband envelopes for identification of faults in rotating machinery, see: col. 2, lines 19-21.

Claim Rejections - 35 USC § 103

6. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piety (US Patent 5,922,963) in view of Henry et al. (US Patent 6,816,810).

Regarding claims 11-13, Piety does not disclose or suggest the data probability distribution is calculated using a kernel density method. Henry discloses Kernel density methods for statistical analyses, see: col. 5, lines 6-7. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Piety the Kernel density methods of Henry because In real-time, these technologies are used to compare actual process behaviour with expected normal behaviour as predicted by the model and as indicated by historical data of stored statistical analyses thereby ensuring the reliability of obtained results and making the above combination very effective.

7. Claims 18-22, 24-30, 32-33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piety (US Patent 5,922,963) in view of Henry et al. (US Patent 6,816,810) and further in view of Whiteside (US Patent 6,438,981).

Regarding claims 19-22, 28-30, 32-33 and 35, they are rejected for the reasons set forth for in paragraphs 5 and 6. However, Piety in view of Henry does not disclose a chiller or HVAC chiller (as required by claims 18-19, 24 and 31). Note that the analysis of Piety includes a plurality of data information which are applicable to different of machines or mechanical equipment. Whiteside discloses water chilling package 10 (col. 4, line 20 and Fig. 1). Whiteside further discloses the content of a representative computer monitor display portion addressing the "fault" arising when the actual power requirements of the chiller exceed the design rated power requirements for such chiller, se: col. 10, lines20-23. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize In the combination of Piety in view of Henry the chiller of Whiteside because it is also a mechanical equipment that is subject to unsatisfactory performance conditions, including chiller vibration, low evaporator fluid temperature leaving the evaporator, and high supply oil to the compressor temperature, among others. Therefore, this combination would perform effectively the monitoring of the vibration amplitude limits of the chiller in an effective and efficient manner.

Regarding claims 25-27, they are similar in scope with claims 7-9 and therefore are rejected for the reasons set forth for these claims.

Allowable Subject Matter

8. Claims 14-16, 23, 34 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M. Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Mondays through Fridays 10:30 A.M. -7:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272 2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jacques M. Saint-Surin
August 21, 2005

HEZRON WILLIAMS
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